

The affects of subsidence in the permit area, on regional or local groundwater flow, are expected to be minor and of short duration. Localized diversions or interceptions of short duration only are expected due to the plastic flow of shaley units and to both development and tightening of existing fractures which occur due to unbalanced compressive-tensile forces associated with subsidence. The reclamation plan proposes to control post-mining subsidence which is expected to be a maximum of 5.5 feet assuming all three seams are mined, with no subsidence to occur in a varying 100 to 200 ft wide corridor from outcrop areas and permit boundary areas, as well as under escarpments.

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In the portion of Federal Lease U-024316 to be permitted, mining will take place in the Tank Seam only, which will limit any subsidence to a maximum of 1.9 feet. In the event mining reaches far enough North to mine at an elevation below Bear Creek, an adequate barrier will be left to completely prevent any impact on Bear Creek. This barrier is shown on Plate 3-3 and described in Appendix 3-C.

#### **7.1.5.2 Quality**

The potential impacts to water quality include contamination of water due to rock dust usage, abandoned equipment, the usage of hydrocarbons, and contamination from road salting. These potential water quality impacts are discussed in detail in Appendix 7-J, Section 9.0 (PHC) and Appendix 7-P.

Rock dust which is used for the suppression of coal dust may potentially impact the groundwater flowing through the mine by the dissolution of the rock dust constituents into the water. This could result in increase concentrations of TDS or sulfates. Gypsum rock dust has been known to result in high TDS concentrations, therefore Co-Op has implemented the use of limestone rock dust. Mine water discharged into Bear Creek is monitored for TDS, as well as the in-mine water monitoring wells, to ensure increased concentrations do not result for the mining activities.

Hydrocarbons (in the form of fuels, greases, and oils) are stored and used on-site for the mining equipment. Spillage of these materials could potentially contaminate the groundwater in the permit area. Section 9.0 of the PHC (Appendix 7-J) discusses in detail the program which Co-Op has implemented to prevent contamination of the groundwater from these sources. Road salting is also discussed. Abandoned equipment is discussed in Appendix 7-P.

#### **7.1.6 Mitigation and Control Plans**

No treatment of groundwater occurrence or other control measures in the present mine have been required. Interference of the groundwater regime has consisted of interception of local perched zones within the Blackhawk formation, with the significant portion of the flow coming from a sandstone channel located at the North end of the Blind Canyon Seam workings.

No treatment of groundwater occurrence or other control measures have been required or are expected to be required for the permit area. See the discussion on mine dewatering in Section 7.1.4.3 and on potential impacts in Appendix 7-J.

Table 7.1-8 Water Monitoring Matrix: Operational Phase of Mining

Location	Jan	Feb	Mar	Apr	May	June	July	Aug <sup>3</sup>	Sept	Oct	Nov	Dec
Streams												
BC-1 (Upper Bear Creek)		oper.			oper.	field	field	oper.	field	oper.		
BC-2 (Lower Bear Creek)		oper.			oper.	field	field	oper.	field	oper.		
BC-3 (Lower Rt Fork Bear Creek)		oper.			oper.	field	field	oper.	field	oper.		
BC-4 (Upper Rt Fk. Bear Creek)		oper.			oper.	field	field	oper.	field	oper.		
MH-1 (McCadden Hollow Creek)						field <sup>5</sup>	field	field			field	
FC-1 (Left Fork Fish Creek)						field <sup>5</sup>	field	field			field	
Springs												
SBC-3 (Creek Well)		oper.			oper.			oper.		oper.		
SBC-4 (Big Bear Springs) <sup>4</sup>		oper.			oper.			oper.		oper.		
SBC-5 (Birch Spring) <sup>4</sup>		oper.			oper.			oper.		oper.		
SBC-9A (Hiawatha Seam)		oper.			oper.			oper.		oper.		
SBC-12 (16-7-13-1)						field. <sup>5</sup>	field	field			field	
SBC-14 (WHR-6)		oper.			oper.			oper.		oper.		
SBC-15 (WHR-5)						field <sup>5</sup>	field	field			field	
SBC-16 (WHR-4)						field <sup>5</sup>	field	field			field	
SBC-17 (16-7-24-4)		oper.			oper.			oper.		oper.		
SMH-1 (FBC-6)						field. <sup>5</sup>	field	field			field	
SMH-2 (FBC-5)						field <sup>5</sup>	field	field			field	
SMH-3 (FBC-13)						field. <sup>5</sup>	field	field			field	
SMH-4 (FBC-4)						field <sup>5</sup>	field	field			field	
Wells												
SDH-2 (Well, Sec. 11, T16S, R7E)						level <sup>5</sup>	level	level	level	level		
SDH-3 (Well, Sec. 10, T16S, R7E)						level <sup>5</sup>	level	level	level	level		
MW-114 (Well, Sec 18, T16S, R8E)						level <sup>5</sup>	level	level	level	level		
MW-117 (Well, Sec 12, T16S, R8E)						level <sup>5</sup>	level	level	level	level		

- Notes:
1. See Tables 7.1-7 and 7.2-5 for listing of water quality monitoring parameters.
  2. oper. = operational base. = baseline
  3. Baseline parameters taken in August of year 5 prior to each permit renewal.
  4. SBC-4 and SBC-5 shall also be tested for oil and grease.
  5. First sample to be taken in May or June, when Gentry Mountain is accessible.

Table 7.1-9 Past and existing monitoring sites

Site ID	Description	Status
Springs		
SBC-1	Under Ground Seep <sup>1</sup>	Dried up early 1988, and monitoring was discontinued.
SBC-2	Portal Well <sup>2</sup>	Dry from 1987. Caved in, lost (2) quarters and relocated in 1991.
SBC-3	Creek Well	Active
SBC-4	Huntington Spring	Active
SBC-5	Birch Spring	Active
SBC-6	COP Development Spring <sup>3</sup>	Dried up in 1987, with no flow through 2000. Monitoring discontinued in 2000.
SBC-12	Bear Creek Source (16-7-13-1)	Active
SBC-14	Right Fork Spring WHR-6	Active
SBC-15	Right Fork Spring WHR-5	Active
SBC-16	Fish Creek Spring WHR-4	Active
SBC-17	Upper Bear Spring 16-7-24-4	Active
SMH-1	MH Left Fork Spring (FBC-6)	Active
SMH-2	MH Water Trough (FBC-5)	Active
SMH-3	MH/Trail Ridge Spring (FBC-13)	Active
SMH-4	MH Right Fork Spring (FBC-4)	Active
In-Mine Sources		
SBC-7	Sump #1	Dried up and discontinued in 2000.
SBC-8	Sump #2	Dried up and discontinued in 2000.
SBC-9	Sump #3 <sup>4 6</sup>	Abandoned in 1999 due to retreat mining and replaced by SBC-13.
SBC-9A	Hiawatha Seam 1 <sup>st</sup> North	Activated in Oct. 2002 when a borehole was drill up to the old SBC9 site.
SBC-10	Sump #4	Flow first measured Dec. 1991. Monitoring initiated Jan. 1992. In July, 1995, retreat mining progressed passed this sump, making it inaccessible. Monitoring was discontinued in August, 1995. Flows from this area have subsequently flowed through the pillared area and out of the 1 <sup>st</sup> East pillared section.
SBC-11	Hiawatha Seam 1 <sup>st</sup> North	Abandoned in Jan 2003 due to roof fall.
SBC-13	1 <sup>st</sup> East Pillared Section <sup>5</sup>	Abandoned in April 2002 due to retreat mining and replaced by SBC-9A
Wells		
DH-1A	2nd W. Monitor Well	Abandoned in 2001 due to retreat mining.
DH-2	3rd W. Monitor Well <sup>6</sup>	Abandoned in 1999 due to retreat mining.
DH-3	1st E. Monitor Well <sup>6</sup>	Abandoned in 1993 due to retreat mining and was replaced by DH-4.
DH-4	3rd W. Bleeder Monitor Well <sup>6</sup>	Abandoned in 1999 due to retreat mining.
SDH-2	Well, Sec. 11, T16S, R7E	Active
SDH-3	Well, Sec. 10, T16S, R7E	Active
MW-114	Wild Horse Ridge Monitor Well	Active
MW-117	Gentry Mtn. Monitor Well	Active

**Appendix 2-A**  
VIOLATION LIST

**Bear Canyon Permit # ACT/015/025**

Violations received in the last 2 years are included in the following pages.

## Appendix 7-P Abandoned Equipment

On January 14, 2003 a roof fall occurred in the Hiawatha seam of the #1 Bear Canyon Mine. This roof fall buried a coal hauler, a distribution box, and a shop trailer. After the roof fall all remaining equipment was removed from the section and the area was sealed off. This is a concern for groundwater contamination since water monitoring site SBC-11 is in the area and there are floor and roof seeps in the area. The entry where the equipment was left is higher then the surrounding entries so water should flow around it. Also drainpipes were installed in the seals close to SBC-11 and also at a lower elevation then the abandoned equipment so water should drain out of the area before reaching the level of the equipment. The water is currently draining from the area through the pipes into monitoring site SBC-9A. Because of hazardous roof conditions in that area it will be abandoned in 2003 or 2004 and the water will be allowed to fill until it reaches entry 26 at which point it will drain to the portals. Co-Op Mining Company uses the water for mine and culinary use and will continue to monitor it for the life of the mine. The anticipated path of the water is illustrated on the following diagram. A copy of the MSHA accident report has also been included. The area of the roof fall is also shown on Plate 7-10B.



Line Accident, Injury and Illness Report

**U.S. Department of Labor**  
**Mine Safety and Health Administration**



Approved For Use Through 06/30/92, OMB Number 1219-0007

**Section A—Identification Data**

MSHA ID Number: 42-01697 Contractor ID: \_\_\_\_\_ Report Category:  Metal/Nonmetal Mining  Coal Mining  Check here if report pertains to contractor.

Mine Name: CW Mining Company Company Name: Bear Canyon #1

**Section B—Complete for Each Reportable Accident Immediately Reported to MSHA**

1. Accident Code (circle applicable code—see instructions):  
 01—Death 02—Serious Injury 03—Entrapment  
 04—Inundation 05—Gas or Dust Ignition 06—Mine Fire 07—Explosives **08—Roof Fall**  
 09—Outburst 10—Impounding Dam 11—Hoisting 12—Offsite Injury

2. Name of Investigator: Ken Defta 3. Date Investigation Started: 

Month	Day	Year
1	14	03

 4. Steps Taken to Prevent Recurrence of Accident: section was abandoned

**Section C—Complete for Each Reportable Accident, Injury or Illness**

5. Circle the Codes Which Best Describe Where Accident/Injury/Illness Occurred (see instructions):  
 (a) Surface Location: 02 Surface at Underground Mine 30 Mill, Preparation Plant, etc. 03 Strip/Open Pit Mine 04 Surface Auger Operation  
 05 Culm Bank/Refuse Pile 06 Dredge Mining 12 Other Surface Mining 17 Independent Shops (with own MSHA ID) 99 Office Facilities  
 (b) Underground Location: 01 Vertical Shaft 02 Slope/Inclined Shaft 03 Face **04 Intersection** 05 Underground Shop/Office 06 Other  
 (c) Underground Mining Method: 01 Longwall 02 Shortwall 03 Conventional Stoping **05 Continuous Mining** 06 Hand 07 Caving 08 Other

6. Date of Accident: 

Month	Day	Year
1	14	03

 7. Time of Accident: 6:45  am  pm 8. Time Shift Started: 6:00  am  pm

9. Describe Fully the Conditions Contributing to the Accident/Injury/Illness, and Quantify the Damage or Impairment:  
Roof Fall in ~~the~~ 12' left entry at #9 and #9  
X-cut approx 130' x 20' x 20' high and coal piled  
D-Box and shop trailer were hit in the fall

10. Equipment Involved: \_\_\_\_\_ Type: \_\_\_\_\_ Manufacturer: \_\_\_\_\_ Model Number: \_\_\_\_\_

11. Name of Witness to Accident/Injury/Illness: \_\_\_\_\_ 12. Number of Reportable Injuries or Illnesses Resulting from This Occurrence: \_\_\_\_\_

13. Name of Injured/Ill Employee: \_\_\_\_\_ 14. Sex:  Male  Female 15. Date of Birth: 

Month	Day	Year

16. Last Four Digits of Social Security Number: \_\_\_\_\_ 17. Regular Job Title: \_\_\_\_\_  18. Check if this injury/illness resulted in death.  19. Check if injury/illness resulted in permanent disability (include amputation loss of use, & permanent total disability).

20. What Directly Inflicted Injury or Illness?: \_\_\_\_\_ 21. Nature of Injury or Illness: \_\_\_\_\_

22. Part of Body Injured or Affected: \_\_\_\_\_ 23. Occupational Illness (circle applicable code—see instructions):  
 22 Dust Diseases of the Lungs 23 Respiratory Conditions (toxic agents) 24 Poisoning (toxic materials)  
 25 Disorders (physical agents) 26 Disorders (repeated trauma) 29 Other

24. Employee's Work Activity When Injury or Illness Occurred	Experience	Years	Weeks
	25. Experience in This Job Title		
	26. Experience at This Mine		
	27. Total Mining Experience		

**Section D—Return to Duty Information**

28. Permanently Transferred or Terminated (if checked, complete items 29, 30, & 31) 29. Date Returned to Regular Job at Full Capacity (or item 28): 

Month	Day	Year

*Answer 30 & 31 when case is closed*  
 30. Number of Days A way from Work (if none, enter 0) 31. Number of Days Restricted Work Activity (if none, enter 0)

Person Completing Form (name): Ken Defta Title: Superintendent  
 Date This Report Prepared (month, day, year): 1/17/03 Area Code and Phone Number: 303-687-5777

MSHA Form 7000-1, July 91 (Revised)

*For Official Use Only*

Degree: \_\_\_\_\_  
 Accident Type: \_\_\_\_\_  
 Accident Class: \_\_\_\_\_  
 Scheduled Charge: \_\_\_\_\_  
 Keyword: \_\_\_\_\_